Utah Secondary Mathematics Core Curriculum

Introduction

Students graduating from Utah high schools face a complex, technological, and constantly changing world. To compete successfully in the growing worldwide economy, students must have adequate preparation in the skills and understanding mathematics provides. Mathematics literacy is essential and the need for it is universal. The Utah State Secondary Mathematics Core outlines the essential skills and understanding required of capable adults.

The goal of the Core Curriculum is to develop mathematical proficiency in **every** student by building a conceptual base and developing mathematical fluency. Students who understand mathematics will be able to communicate their reasoning, use multiple representations, and think logically. They will develop positive attitudes toward mathematics, solve problems, and think creatively while connecting mathematics to other disciplines and to life. Students will use mathematical tools, such as manipulative materials and technology, to develop conceptual understanding and solve problems.

The Secondary Mathematics Core describes what students should know and be able to do at the end of each of the six core courses: Math 7, Prealgebra, Algebra 1, Geometry, Algebra 2, and Precalculus. Every standard and objective is essential and will be tested. This does not suggest that all objectives are of equal importance in developing students' proficiency, nor that they should receive an equal amount of time in the classroom.

The Secondary Mathematics Core was developed and revised by a community of Utah mathematics teachers, mathematicians, university mathematics educators, and State Office of Education specialists. It was critiqued by an advisory committee representing a wide variety of people from the community, as well as an external review committee. The Core reflects the current philosophy of mathematics education as expressed in national documents developed by the National Council of Teachers of Mathematics, the American Statistical Association, the College Board, and Achieve. This Mathematics Core has the endorsement of the Utah Council of Teachers of Mathematics. The Core reflects high standards of achievement in mathematics for all students.

Key Components of Teaching and Learning Mathematics

Teachers

Delivery of the core requires highly knowledgeable and qualified teachers in every secondary mathematics classroom. Mathematics teachers must be well prepared with an extensive knowledge of both mathematics and pedagogy. They must have an understanding of students and student learning and be able to adapt classroom instruction to meet student needs.

Students
Students in mathematics classrooms must take responsibility for their learning while receiving strong support from teachers, parents, and an informed society that recognizes the importance of a comprehensive mathematics education. They will understand mathematics more deeply through participation in activities that build and strengthen a profound understanding of mathematics and applications of mathematics. Their knowledge will be further enhanced through connections to prior learning and other disciplines.

Assessment
Assessment is an integral part of the curriculum and a routine part of classroom instruction. It must be rich and varied, consisting of both formative assessments that are used to inform instruction and summative assessments that are used to gauge student learning. Assessments provide students, teachers, and parents with important information about student progress and classroom effectiveness.

Technology
The purpose of technology is to enhance the investigation and modeling of a wide variety of mathematical concepts and engage students in the learning process. Technology must be integrated in the curriculum and used appropriately as part of mathematical instruction and assessment. Technology facilitates the organization and analysis of data, and efficiency and accuracy in computation and, used appropriately, has been shown to be a tool that can support the development of flexibility in the use of various representations. It is used to provide visual images leading to understanding of mathematical ideas and concepts.

Course Articulation
The Utah State Secondary Mathematics Core provides one course sequence for all students; however, the course in which students enter the sequence in the seventh grade may differ depending on individual student readiness. The sequence of the courses is Math 7, Prealgebra, Algebra 1, Geometry, Algebra 2, Precalculus and AP Calculus and/or AP Statistics. Students who wish to complete AP Calculus or AP Statistics before graduation should be enrolled in Algebra 1 by eighth grade. Students who take four years of mathematics in high school and complete Precalculus will be well prepared to enter college doing college-level mathematics or to pursue other post-secondary experiences.

The initial placement of students in a seventh grade mathematics course has far-reaching implications. The most appropriate placement must take into consideration the student's level of cognitive development, emotional maturity, work ethic, and study habits. Success in algebra depends on a solid conceptual understanding of arithmetic and rational numbers, obtained through mastery of the Utah State Elementary Core.

The Utah State Office of Education has also defined several applied, advanced, and supplementary courses for students in need of either remediation or acceleration. Course titles and syllabi are available on the USOE web site.

Organization

The Core is designed to help teachers organize and deliver instruction.

- ❖ Each grade level begins with a course description emphasizing key concepts.
- ❖ The **Intended Learning Outcomes** (ILOs) describe the skills and attitudes students should acquire as a result of successful mathematics instruction. They are an integral part of the Core.
- ❖ A **Standard** is a broad statement of what students are expected to understand. Several Objectives are listed under each Standard.
- ❖ An **Objective** is a more focused description of what students need to know and be able to do at the completion of instruction. If students have mastered the Objectives associated with a given Standard, they have mastered that Standard for that course.
- ❖ **Indicators** are observable or measurable student actions that enable students to master an Objective. Indicators can help guide classroom instruction.

Course Requirements

1. Students may complete a combination of core and applied, advanced, and supplemental (AAS) courses to meet the minimum graduation requirements. A minimum of two credits must be earned from the core sequence. AAS course listings are available on the Secondary Mathematics Web Page.

2. No student may obtain two high school mathematics credits (9-12) for completing the same course.

3. Students may not take a course for mathematics graduation credit that is a prerequisite of a previously completed secondary mathematics course (7-12). The prerequisite of each course is listed at the beginning of each course description.

4. Courses at algebra level or above may be used for graduation credit.

5. Students should receive appropriate counseling as they register for mathematics courses so that they will be able to complete the current graduation requirements for mathematics, and to make sure they will have the mathematical training needed to succeed in the post-secondary training of their choice.

6. Finishing a mathematics course beyond Intermediate Algebra is a key predictor of collegiate success and completion (U.S. Department of Education, *The Toolbox Revisited: Paths to Degree Completion from High School Through College*, 2006).

Course Offerings Available by Grade

7th Grade
    Math 7
    Prealgebra
    Algebra 1

8th Grade
    Prealgebra
    Algebra 1
    Geometry

9th Grade
    Algebra A (AAS)
    Algebra 1
    Geometry
    Algebra 2

10th Grade
    Algebra B
    Algebra 1
    Geometry
    Algebra 2
    Precalculus
    AAS Courses

11th Grade
    Algebra 1
    Geometry
    Algebra 2
    Precalculus
    A. P. Calculus
    A. P. Statistics
    AAS Courses

12th Grade
    Algebra 1
    Geometry
    Algebra 2
    Precalculus
    A.P. Calculus
    A.P. Statistics
    AAS Courses